An Intelligent Pen-Based Ophthalmologic Patient Record

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In this demonstration, we will show a prototype pen-based patient record system which enables forms to be customized for various specialties. One unique feature of this system is the intelligent drawing, which captures the type of features drawn by the physician and uses that information to determine which diagnoses and procedures are likely. The physician can then verify these choices.

This prototype is the result of a collaboration between two organizations of Johns Hopkins (the Applied Physics Laboratory [APL] and the Wilmer Eye Institute) to develop a computer-based automated outpatient medical records system. Discussions with various physicians at the Wilmer Institute indicated that the available pen-based front ends would not meet the needs of the physicians at Wilmer because they were oriented to the needs of the general ophthalmologist, not the specialist.

What the physicians wanted was an affordable system with the ability to customize forms for different specialties. In addition, the physicians felt that the computer should be able to assist them in the complex task of encoding the procedures and diagnoses. This encoding needed to be done in an optimal fashion, ensuring that all procedure and diagnostic requirements for a particular billing code were met.

The system concept we developed is based on pen-based tablet PC's. Providers (predominantly physicians, but also nurses and technicians) would use their personal pen-based PC as a means both to enter patient data (diagnoses, records, notes, drawings, etc.) and to access the patient's medical record on an interactive and mobile basis. It is planned that the system will incorporate semantic database keys to enable access and analysis of the stored data by users both internal and external to the hospital. This is envisioned as the first phase of a system which could be applied to the entire hospital system.

To understand the system requirements and to involve the physicians in the design process, a prototype of the pen-based PC user interface has been developed. The Diabetic Retinopathy forms used in the Medical Retina Department were well suited to pen-based computer application, so they were chosen for the prototype. These forms include most of the types of input proposed for the system, including the intelligent retinal drawing.

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